XML in Application

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UC Berkeley / OpenContext.org

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“How I learned to stop worrying and love the Web (and XML)”
Data Sharing as Publication

- Started in 2007
- Open data (mainly CC-By)
- Archiving by California Digital Library
- Part of a broader reform movement in scholarly communications
DIPIR (http://www.dipir.org)

- 3-Year project, Oct. 2010-Sept. 2013
- National Leadership Grant from the Institute for Museum and Library Services (LG-06-10-0140-10)
- Ixchel Faniel (PI), Elizabeth Yakel (Co-PI)
Raw Data Can Be Unappetizing
I use an Excel spreadsheet...which I ... inherited from my research advisers. ...my dissertation advisor was still recording data for each specimen on paper when I was in graduate school so that's what I started ...then quickly, I was like, "This is ridiculous.“... I just started using an Excel spreadsheet that has sort of slowly gotten bigger and bigger over time with more variables or columns...I've added ...color coding...I also use...a very sort of primitive numerical coding system, again, that I inherited from my research advisers...So, this little book that goes with me of codes which is sort of odd, but ...we all know that a 14 is a sheep.” (CCU13)

A long way to go before we get usable, intelligible data
Sometimes data is better served cooked.
1. Referenced by US National Science Foundation and National Endowment for the Humanities for Data Management
2. “Data sharing as publishing” metaphor
38 projects currently published (with varying degrees of comprehensiveness)
38 different schemas and many different vocabularies (few “standards” in archaeology)
Project: Asian Stoneware Jars

Element composition of Asian Stoneware Jars from the 9th - 19th centuries CE

Project Overview

Introduction
Asian production and trade in plain and decorated porcelain tablewares became increasingly prominent in the Asian and later international maritime economy from as early as the 9th century CE. One of the less well understood aspects of this trade was the production of large stoneware jars. This project seeks to elementally characterize a wide and diverse range of these jars using inductively coupled plasma optical emission spectrometry (ICP-OES) and neutron activation analysis (NAA), and proton-induced X-ray and γ-ray emission spectrometry (PIXE-PGE) to better understand likely provenance as well as production dynamics over the period.

Project Editorial Status

Managing editor reviewed

Suggested Citation


Location data should account for these inaccuracies.

Related References


Browse this Project

- Philippines
  - 158 items contained in this context.
  - Dating between: 1538 to 1638
- Northern Mariana Islands
  - 66 items contained in this context.
  - Dating between: 1370 to 1830
- Malaysia
  - 62 items contained in this context.
  - Dating between: 1530 to 1750
- South Africa
  - 61 items contained in this context.
  - Dating between: 1629 to 1727
- Mauritius
  - 33 items contained in this context.
  - Dating between: 1515 to 1636
- Australia
  - 32 items contained in this context.
  - Dating between: 1750 to 1800
- Indian Ocean
  - 8 items contained in this context.
  - Dating between: 1500 to 1550
**Project: Archaeology of Mesoamerican Animals**

Datasets and media with 'The Archaeology of Mesoamerican Animals' (Lockwood Press)

Number of Views: 50

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**Project Overview**

This represents a forthcoming publication of datasets and other media that will supplement some chapters of *The Archaeology of Mesoamerican Animals*, an edited volume to be published with Lockwood Press.

**Book Reference**

Götz, Christopher M., and Kitty F. Emery (Editors)

In press: *The Archaeology of Mesoamerican Animals (La arqueología de los animales de Mesoamérica)*, Atlanta, GA, Lockwood Press.

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**Book Abstract (from Lockwood’s Website)**

Recognition of the role of animals in ancient diet, economy, politics, and ritual is vital to understanding ancient cultures fully, while following the clues available from animal remains in reconstructing environments is vital to understanding the ancient relationship between humans and the world around them. In response to the growing interest in the field of zooarchaeology, this volume presents current research from across the many cultures and regions of Mesoamerica, dealing specifically with the most current issues in zooarchaeological literature. Geographically, the essays collected here index the different aspects of animal use by the indigenous populations of the entire area between the northern borders of Mexico and the southern borders of lower Central America. This includes such diverse cultures as the Olmec, Maya, Zapotec, Mixtec, and Central American Indians. The time frame of the volume extends from the Preclassic to recent times. The book’s chapters, written by experts in the field of Mesoamerican zooarchaeology, provide important general background on the domestic and ritual use of animals in early and classic Mesoamerica and Central America, but deal also with special aspects of human-animal relationships such as early domestication and symbolism of animals, and important yet otherwise poorly represented aspects of taphonomy and zooarchaeological methodology.

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**Forthcoming Digital Content**

- **Chapter 1** Christopher M. Götz, *Digital Companion to ‘Introduction’*: DOI: 10.6078/M71Z429Q
- **Chapter 2** Elizabeth S. Wing, *Digital Companion to ‘Dog Remains from the Marismas Nacionales’*: DOI:10.6078/M78G2WKWR
- **Chapter 5** Tanya M. Peres, Amber M. VanDerwarker, and Christopher A. Pool, *Digital Companion to ‘The Zoobiological of Olmec and epi-Olmec Foodways Along Mexico’s Gulf Coast’*: DOI:10.6078/M76Q1VF5
- **Chapter 8** Christopher M. Götz, and Travis W. Stanton, *Digital Companion to ‘The Use of Animals by the Prehispanic Maya of the Northern Lowlands’*: DOI:10.6078/M77H1G65
- **Chapter 9** Marilyn A. Masson and Carlos Ferraz Lopes, *Digital Companion to ‘Animal Consumption at the Monumental Center of Maya’*: DOI:10.6078/M76Q1VF5
Item: FC 20030129
Class: Objects

Context (click to view): Italy / Poggio Civitate / Tesoro / Tesoro32 / Tr-ID 509

Descriptive Properties (0)

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<th>Value</th>
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<td>Bronze</td>
</tr>
<tr>
<td>Object Type</td>
<td>Costume, Accessories: Chain / Links</td>
</tr>
<tr>
<td>Fragment Noted</td>
<td>false</td>
</tr>
<tr>
<td>Object Type</td>
<td>Bronze Link Bracelet</td>
</tr>
<tr>
<td></td>
<td>(notes)</td>
</tr>
<tr>
<td>Size</td>
<td>Max. Pres. Diameter of Bracelet 0.075 m, Max. Pres. Diameter of Link 0.005 m</td>
</tr>
<tr>
<td>Condition</td>
<td>Bracelet is essentially intact with four associated detached portions of links. The surfaces of the links and clasps are distorted in color and wear due to corrosion and oxidation.</td>
</tr>
<tr>
<td>Description</td>
<td>A nearly intact bronze bracelet preserves 56 circular links, each composed of thin bronze wire coiled three times. The bracelet also preserves three longer &quot;clasps&quot; each composed of a length of wire bent in a lateral loop at one end, brought together and straightened, then curved back around vertically in a smaller double loop.</td>
</tr>
<tr>
<td>Munsell</td>
<td>Mottled - GLEY 5G 5/2 grayish green, GLEY 5G 7/2 pale green</td>
</tr>
</tbody>
</table>

Item Notes:
The Poggio Civitate Excavation Project website originally included this object at this address:

http://poggio civitate.classics.umass.edu/catalog/viewartifactcatalog.asp?id=FC2003012900

Linked Media (15)

Linked Persons / Organizations (1)

Anthony Tuck, Director
Today it is the last day of the season. Because of this reason we tried to hurry. Our first aim was to take out the mud-brick wall L7121. We wanted to be sure on taken of the mud-brick wall L7121 was sitting on. We have taken of the mud-brick wall with trowels and we have observed that the wall was sitting on an ash layer L7132. Besides these I have removed the oven L7124. Little amount of potsherds came out of it. The construction material of the oven seems to be highly burned. During removing and after sweeping the L7124 I was able to observe that the whole oven was located on an ash layer. But this ash layer is not the same as the one in L7132. This different ash layer makes us think that there is no connection in between the oven L7124 and the so-called Late Cholcolithic house.

In addition to these I have opened two loca numbers. These two new loca members. These two new loca numbers belong to two pits which are sitting on L7126. But these two pits are to be investigated in the season of 2005.

All in all we have cleared and swept the entire trench, then I have taken the last photos of the trench, and by taking 42 elevations of the trench use have closed the trench for this season.
Media Properties (6)

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<tr>
<td>Photo type</td>
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<tr>
<td>Album ID</td>
<td>0</td>
</tr>
<tr>
<td>Description</td>
<td>This bone inlay preserves the full form of a human face and portions of the neck. The features of the face are as follows: a wide forehead, almond shaped protruding eyes with inlaid orbitals; a triangular pointed nose; prominent cheekbones; clearly defined straight mouth; and a narrow and pointed chin. The neck is flat and rectangular in cross section. The top of the head is flat and set at a slightly angled plane. The back of the head is flat and set at a slightly angled plane. The base of the neck is flat. The inlay is light brown with darker markings. The edges are smooth and rounded.</td>
</tr>
</tbody>
</table>

Copyright Licensing

The artwork depicted in this image is protected by copyright. Please see the copyright notice for more information.
Global Schema

- "ArchaeoML" (Archaeological Markup Language)
- Developed at University of Chicago
- Some common (but abstract) semantics
Attribute – Value Pairs ("Properties")

- Fabric Category: Bronze
- Object Type: Costume, Accessories

Example XML:
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    <arch:valueID>40000276-FD66-4BC5-5140-91AD1E174B9A</arch:valueID>
    <arch:propid href="http://opencontext.org/properties/251E8D03-7267-4C14-638A-C899AEDBCEB3">251E8D03-7267-4C14-638A-C899AEDBCEB3</arch:propid>
    <arch:var_label type="nominal">Fabric Category</arch:var_label>
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</arch:property>
```

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<arch:property>
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    <arch:var_label type="nominal">Object Type</arch:var_label>
    <arch:show_val>Costume, Accessories::Chain / Links</arch:show_val>
</arch:property>
```
Sometimes add additional semantics (referencing concepts / entities via URIs)
Web of Data (2011)

Should you Care?

- Mainly academic (except Freebase)
- Semantic Web or something more pragmatic?
Item: Bone J8c22.31
Class: Animal Bone

Context (click to view): Türeki / Öküzini Cave / VII / Square J8c

Descriptive Properties (23)

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<td>Osteo Id</td>
<td>Metatarsus III + IV</td>
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<tr>
<td>Taxonomic Id</td>
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<tr>
<td>Articulation</td>
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<tr>
<td>Symmetry</td>
<td>Right</td>
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<tr>
<td>Sex</td>
<td>Nonidentified</td>
</tr>
<tr>
<td>Pathology</td>
<td>No pathology</td>
</tr>
</tbody>
</table>

Linked Data:
- Open Context Zooarchaeology Annotations-Has anatomical identification :: UBERON (Uber Anatomy Ontology)- fused metatarsal bones 3 and 4
- Biological Taxonomy Vocabulary-Has Biological Taxonomy :: Encyclopedia of Life- Ovis orientalis
- Open Context Zooarchaeology Annotations-Has fusion character :: Open Context Zooarchaeology Annotations- Distal epiphysis unfused

Linked Persons / Organizations (1)
- Levent Atili, Principle Author / Analyst
Linked Data:
Open Context Zooarchaeology Annotations-Has anatomical identification :: UBERON (Uber Anatomy Ontology)- fused metatarsal bones 3 and 4

Biological Taxonomy Vocabulary-Has Biological Taxonomy :: Encyclopedia of Life- Ovis orientalis

Open Context Zooarchaeology Annotations-Has fusion character :: Open Context Zooarchaeology Annotations- Distal epiphysis unfused
Uber anatomy ontology

Class: fused metacarpal bones 3 and 4

- Term IRI: http://purl.obolibrary.org/obo/UBERON_0013587
- definition: An element formed from the fusion of metacarpal 3 and metacarpal 4. [database_cross_reference: http://orcid.org/0000-0001-7920-5321]

Annotations

- has_obo_namespace: uberon
- has_exact_synonym: fused metacarpal 3/4
- has_related_synonym: metacarpal 3+4
- id: UBERON:0013587
- comment: In many arthrodactyls, the 3rd & 4th metapodials are fused, creating a main metapodial.

Equivalents

- metacarpal bone and (has_fused_element some metacarpal bone of digit 3) and (has_fused_element some metacarpal bone of digit 4)

Class Hierarchy

Thing
- anatomical entity
  + material anatomical entity
  + anatomical structure
    + organ
      + skeletal element
        + bone element
          + bone of appendage girdle complex
            + bone of free limb or fin
              + limb bone
                + autopod bone
                  + digitopodium bone
                    + metapodium bone
                      + fused metapodial bones 3 and 4
                        - fused metatarsal bones 3 and 4
                        - fused metacarpal bones 3 and 4

Superclasses & Asserted Axioms

- fused metapodial bones 3 and 4
Why Reference Ontologies?

1. Expresses relevant expert knowledge, tremendous effort. Why ignore or duplicate this effort?

Linked Data:
Open Context Zooarchaeology Annotations-Has anatomical identification :: UBERON (Uber Anatomy Ontology)- fused metatarsal bones 3 and 4

Biological Taxonomy Vocabulary-Has Biological Taxonomy :: Encyclopedia of Life- Ovis orientalis

Open Context Zooarchaeology Annotations-Has fusion character :: Open Context Zooarchaeology Annotations- Distal epiphysis unfused

Depth of the medial trochlear condyle (D) = 11.7
Greatest depth of the distal end (Dd) = 17.5
Greatest breadth of the distal end (Ed) = 27.2

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"Ovis aries"
http://eol.org/pages/311906/

- Ovis aries
  - Schaf
  - Domestic sheep
    - Code: 14
    - Code: 70
- Sheep
  - Code: 15
- O. aries
  - Sh.
  - Code: 16
Linking relations to other related XML documents (Describing a “graph”, a data model Erik will discuss more later)
Where do we get the XML?

- Schema mapping (source data tables) mapped into MySQL relational database (abstract, general schema)
- MySQL + PHP generates XML documents
- Since 2007, since then new tools: Open Refine, graph data stores, NoSQL databases, etc.
XML use:
- Some nodes have mixed content
- XHTML (+ RDFa)
- Other nodes easier for databases
Asian production and trade in plain and decorated porcelain tablewares become increasingly prominent in the Asian and later international maritime economy from as early as the 9th century CE. One of the less well understood aspects of this trade was the production of large stoneware jars. This project seeks to elementally characterize a wide and diverse range of these jars using inductively coupled plasma optical emission spectrometry (ICP-OES) and neutron activation analysis (NAA), and proton-induced X-ray and γ-ray emission spectrometry (PIXE-PIGE) to better understand likely provenance as well as production dynamics over this period.

Because of site security risks and other factors, all location information presented in this project is approximate. Indicated locations may be over 100 km. from their true positions. Analytic uses of these location data should account for these inaccuracies.
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Related References
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Because of site security risks and other factors, all location information presented in this project is approximate. Indicated locations may be over 100 km. from their true positions. Analytic uses of these location data should account for these inaccuracies.

RDFa (“Linked Data” in XHTML)
Asian production and trade in plain and decorated porcelain tablewares become increasingly prominent in the Asian and later international maritime economy from as early as the 9th century CE. One of the less well understood aspects of this trade was the production of large stoneware jars. This project seeks to elementally characterize a wide and diverse range of these jars using inductively coupled plasma optical emission spectrometry (ICP-OES) and neutron activation analysis (NAA), and proton-induced X-ray and γ-ray emission spectrometry (PIXE-PIGE) to better understand likely provenance as well as production dynamics over this period.

Because of site security risks and other factors, all location information presented in this project is approximate. Indicated locations may be over 100 km. from their true positions. Analytic uses of these location data should account for these inaccuracies.

Related References
ArchaeoML XSDs disappeared in 2010 😞
Nobody else uses it (potential as interchange format not realized)
Not a huge amount of XML expertise in domain
More widespread interest in RDF (in academia)
### Table: “Çatalhöyük Main Zooarchaeological Dataset”

The data in this table comes from one project or collection. Some data relating to the records in this table may depend upon complex structures that cannot be easily represented in a table format. If you need data fully expressing such complex structures, download the XML representations of these data. To learn how to do this, please read the web-services documentation.

**Download Table: CSV format**

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</tr>
</thead>
<tbody>
<tr>
<td>Number of Records</td>
<td>126116</td>
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This is the main data table for the "Çatalhöyük Zooarchaeology" project. To promote interoperability and facilitate reuse, Open Context editors annotated these data with Encyclopedia of Life (EOL) and UERON identifiers. In addition, Open Context editors related relevant data to the "Open Context Zooarchaeology" ontology / controlled vocabulary. Support for this data publication came from the Encyclopedia of Life Computational Data Challenge.

These data describe specimen from all of the Çatalhöyük excavation areas, except for Area TP, which is available in another table.

<table>
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<td>David Orton, Sheelah Frame, Louise Martin, Kathryn Twissa, Narissa Russell</td>
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Much more comfort, familiarity in domain (despite limitations)
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XML to CSV:

- Scripting (PHP) with XPath to convert many XML docs to CSV records
- Many nodes ignored, not mapped to CSV
- But! Most users use Excel, want CSV
- “Primary keys” in CSV data are Web URIs, can link back to more expressive XML representations
Services (not just data)

- Atom
- JSON
- GeoJSON
- KML
Atom: Standard Container
(After Wilde)
Atom: Standard Container

Services (not just data)
- URIs / URLs to resources
- Meaningful links (navigate the service, paging, further queries)
- Published, update metadata
- Widely understood XML format
One does not simply share usable data…
“Open Data” Starting Points

- Different formats good for different purposes, XML great but not ideal for all uses / comunitites
- HTTP URIs (Often a good way to identify things)
- REST(ish). Services provide links to follow to get data. Erik can explain more…